

WHAT IS CLAIMED IS:

- 1 1. A method of forming a headliner for a vehicle, comprising:
2 overlying a cover material onto a multi-layer substrate;
3 at least partially separating the cover material from the substrate
4 during said overlaying step;
5 clamping the cover material;
6 clamping the substrate separately from the cover material;
7 transporting the overlayed cover material and substrate into a mold;
8 unclamping the substrate while the cover material remains clamped;
9 and
10 molding the cover material and substrate together to form the
11 headliner.
- 1 2. The method of claim 1, wherein said step of clamping the
2 cover material comprises using a jaw clamp to hold the cover material, and said step
3 of clamping the substrate comprises using a plurality of discrete clamping members
4 to clamp the substrate.
- 1 3. The method of claim 2, wherein each said discrete clamping
2 member comprises a pneumatically actuated pin member.
- 1 4. The method of claim 2, wherein said jaw clamp comprises a
2 pivotable structure including a plurality of teeth.
- 1 5. The method of claim 1, wherein clamps used for said
2 clamping steps are movable for said transporting step.
- 1 6. The method of claim 1, wherein said step of at least partially
2 separating comprises providing at least one separator plate along an edge of the
3 cover material between the cover material and the substrate.

1 7. The method of claim 6, wherein said separator plate includes
2 a movable portion to facilitate cutting of the cover material and substrate.

1 8. The method of claim 1, further comprising unclamping the
2 cover material after unclamping the substrate.

1 9. The method of claim 2, further comprising selectively
2 unclamping said discrete clamping members at different times.

1 10. A shuttle assembly for transporting a cover material and
2 substrate into a mold to form a headliner, the shuttle assembly comprising:

3 at least one movable rail;

4 a first clamping apparatus operatively connected to the rail for
5 clamping the cover material; and

6 a second clamping apparatus operatively connected to the rail for
7 clamping the substrate;

8 wherein said first clamping apparatus is unclampable separately from
9 the second clamping apparatus to facilitate unclamping of the substrate prior to
10 unclamping of the cover material when the cover material and substrate are
11 positioned in the mold to minimize stretching of the substrate and to prevent
12 formation of wrinkles in the cover material.

1 11. The shuttle assembly of claim 10, wherein said second
2 clamping apparatus comprises a plurality of discrete clamping members.

1 12. The shuttle assembly of claim 11, wherein each said discrete
2 clamping member comprises a pneumatically actuated pin member.

1 13. The shuttle assembly of claim 10, wherein said first clamping
2 apparatus comprises a pivotable jaw clamp including a plurality of teeth.

1 14. The shuttle assembly of claim 11, wherein said plurality of
2 discrete clamping members are unclampable at different times.

1 15. A conveyor assembly for receiving and transporting a cover
2 material and substrate into a mold to form a headliner, the conveyor assembly
3 comprising:

4 a separator for separating the cover material from the substrate;

5 at least one movable rail;

6 a first clamping apparatus operatively connected to the rail for
7 clamping the cover material; and

8 a second clamping apparatus operatively connected to the rail for
9 clamping the substrate,

10 wherein said first clamping apparatus is unclampable separately from
11 the second clamping apparatus to facilitate unclamping of the substrate prior to
12 unclamping of the cover material when the cover material and substrate are
13 positioned in the mold to minimize stretching of the substrate and to prevent
14 formation of wrinkles in the cover material.

1 16. The conveyor assembly of claim 15, wherein said separator
2 is positioned to separate an edge of the cover material from the substrate.

1 17. The conveyor assembly of claim 16, wherein said separator
2 includes a movable portion adjacent a cutter to facilitate cutting of the cover material
3 and substrate.

1 18. The conveyor assembly of claim 15, wherein said second
2 clamping apparatus comprises a plurality of discrete clamping members.

1 19. The conveyor assembly of claim 18, wherein each said
2 discrete clamping member comprises a pneumatically actuated pin member.

1 20. The conveyor assembly of claim 15, wherein said first
2 clamping apparatus comprises a pivotable jaw clamp including a plurality of teeth.

1 21. The conveyor assembly of claim 15, wherein said plurality of
2 discrete clamping members are unclampable at different times.

1 22. The conveyor assembly of claim 15, further comprising a
2 puller for pulling the substrate and cover material into a position to be clamped by
3 said first and second clamping apparatuses.

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